

ORIGINAL ARTICLE

Global public awareness about atrial fibrillation

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Abstract

Background: Atrial fibrillation (AF) is an important cause of ischemic stroke that often remains undetected until stroke occurs. Awareness of the risk factors and symptoms is important so that AF can be diagnosed and thromboprophylaxis given. However, the extent of public awareness of AF is uncertain. We assessed public awareness of AF across six continents and compared it with that of other thrombotic and non-thrombotic disorders.

Methods: In collaboration with Ipsos-Reid, we conducted an internet-based, cross-sectional survey between September and October of 2016 in 10 countries: Argentina, Australia, Canada, Germany, Japan, Thailand, the Netherlands, Uganda, United Kingdom, and United States. Participants were selected from survey panels in weighted, age-stratified categories (40-60, 61-74, and ≥ 75 years). The survey included 11 questions about demographics and assessed awareness about AF, as well as that of other thrombotic and non-thrombotic disorders. Proportions and 95% confidence intervals (CI) were calculated.

Results: Of a total of 6312 respondents, overall awareness of AF was 48% (95% CI, 46-50%), which was lower than awareness about other thrombotic and non-thrombotic

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disorders except for deep vein thrombosis (awareness 43%, 95% CI, 41-45%). Awareness about AF ranged from 25% to 69% across countries, while awareness of the risk factors for AF ranged from 8% to 52%, and awareness that AF leads to stroke ranged from 36% to 46%. Among those reporting awareness of AF, 82% correctly identified palpitations as an AF symptom.

Conclusions: Global public awareness of AF is low. Improving awareness may empower patients to seek timelier stroke preventive care.

KEYWORDS

atrial fibrillation, awareness, global, international, population, prevention, survey, thrombosis

Essentials

- Early recognition of atrial fibrillation helps in stroke prevention.
- Survey in 10 countries to assess public awareness of atrial fibrillation.
- Overall global awareness of atrial fibrillation was 48%.
- Less than 46% of participants were aware atrial fibrillation leads to stroke.

1 | INTRODUCTION

In 2010, there were an estimated 33.5 million cases of atrial fibrillation globally and about 5 million new cases annually.¹ In contrast to decreasing incidence rates of ischemic heart disease, the age-adjusted incidence of atrial fibrillation continues to rise.^{2,3} If patients with atrial fibrillation were promptly diagnosed and treated, the incidence of ischemic stroke would likely decrease even more rapidly. Therefore, public awareness of atrial fibrillation, in particular understanding its risk factors and symptoms, is critical to address this public health problem.

The Future of Anticoagulation Initiative International Steering Committee recently recommended improved public awareness of atrial fibrillation.⁴ These efforts include the Global Atrial Fibrillation Alliance Foundation's World Atrial Fibrillation Awareness Day in the US,⁵ the Heart Rhythm Week screening program in Belgium,⁶ and the establishment of October 13 as World Thrombosis Day by the International Society on Thrombosis and Haemostasis (ISTH). Since 2014, ISTH and World Thrombosis Day partners have focused on activities aimed to reduce the global burden of thrombotic disorders, including hospital acquired venous thromboembolism and ischemic stroke associated with atrial fibrillation.

The extent of global awareness of atrial fibrillation is unknown. To address this gap, we conducted an internet survey in 10 countries across every continent (except Antarctica) to compare global public awareness of atrial fibrillation with that of other thrombotic and non-thrombotic disorders.

2 | METHODS

2.1 | Survey instrument

In collaboration with Ipsos-Reid, an international social and media research firm, we developed an internet-based quantitative survey to

assess public awareness about atrial fibrillation, other thrombotic disorders (i.e, thrombosis, pulmonary embolism, deep vein thrombosis, heart attack, and stroke) and common non-thrombotic disorders (hypertension, HIV/AIDS, diabetes, breast cancer, and prostate cancer). A fictitious condition "haemo-distension syndrome" was included as a quality control measure to assess the extent to which participants over-estimate their awareness of medical conditions. Ipsos-Reid contracts with Survey Sampling International (SSI) to administer surveys to participants aged ≥ 18 years who were previously on Internet panels who had opted-in to do online research.⁷

The survey included questions about awareness of the risk factors, symptoms and signs, and complications of atrial fibrillation. Most of the questions used a check box/select all that apply format. Two questions used a Likert scale (1 [low] to 5 [high]); the first to assess personal concern for the various health conditions and the second to assess agreement with the following atrial fibrillation-related statements: (1) Taking your pulse is a reliable way to diagnose atrial fibrillation; (2) Atrial fibrillation can easily be diagnosed by a doctor taking your pulse; (3) Atrial fibrillation is almost always treated with surgery; and (4) Atrial fibrillation can cause a stroke.

Solicited demographic information included age, gender, education level (less than high school, some high school, graduation from high school, some college or university, college or university degree, or post graduate degree), country of residence, and general population density of residence (major city, small city, or living in an area far away from a city of any size). The survey, which could be completed in about 5 minutes, is included in the Appendix.

2.2 | Selection of survey participants

The survey was conducted between September 22 and October 13, 2016 in the following 10 countries: Argentina, Australia, Canada,

TABLE 1 Distribution of demographic characteristics of participants (n = 6324)

Demographic characteristic	n*	% [†]	95% CI
Age (years)			
40-60	1407	60.1	(58.6, 61.6)
61-74	2165	26.4	(25.2, 27.6)
75+	2752	13.5	(12.7, 14.3)
Gender			
Female	3131	52.0	(50.3, 53.8)
Male	3193	48.0	(46.2, 49.7)
Density of residence			
In or near major city	3417	54.9	(53.2, 56.6)
In or near small city	2294	35.1	(33.5, 36.8)
Far away from city of any size	613	10.0	(9.0, 11.0)
Highest level of education			
Less than high school	745	9.5	(8.6, 10.5)
Some high school	505	7.3	(6.4, 8.2)
High school	1838	28.1	(26.6, 29.7)
Some college or university	1093	18.6	(17.2, 20.0)
College or university degree	1563	27.6	(26.1, 29.3)
Post-graduate degree	580	8.9	(8.0, 9.9)
Country			
Argentina	382	6.0	(5.4, 6.8)
Australia	781	12.3	(11.2, 13.6)
Canada	780	12.3	(11.2, 13.6)
Germany	632	10.0	(9.1, 11)
Japan	780	12.3	(11.3, 13.4)
The Netherlands	732	11.6	(10.5, 12.7)
Thailand	141	2.2	(1.9, 2.6)
Uganda	620	9.8	(8.7, 11.0)
United Kingdom	693	11.0	(9.9, 12.1)
United States	783	12.4	(11.2, 13.7)

CI, confidence interval.

*Unweighted counts.

[†]Percent of weighted frequency.

Germany, Japan, Thailand, the Netherlands, Uganda, United Kingdom (UK), and the United States (US). Surveys were translated into Spanish, German, Japanese, Thai, Dutch, Swahili, and French and back-translated into English. In addition, surveys were available in North American English, UK English, and Australian English in their respective countries. Respondents were 40 years of age or older who had been previously recruited to Internet panels and had opted-in to do online research. Invitations were sent via email with a link to the survey and there was no additional solicitation. Eligibility was based on age, sex, and country of residence and was determined at the start of each survey. Ipsos-Reid offered points

for each completed survey commensurate with the time required to complete it. Points could be redeemed for rewards, such as gift cards for local popular merchants.

We aimed to collect between 140 and 780 participants from each country for a total sample size of 6312. By age group, 1400 participants were aged 40-60 years (140 per country), 2160 were aged 61-75 years (240 per country except 0 in Thailand), and 2752 were aged 75+ years (0 in Argentina and Thailand, 240 in Uganda, 252 in Germany, 311 in the UK, 349 in the Netherlands, and 400 each in the US, Canada, Australia, and Japan). The differences in participation across age categories likely reflect the association between age and internet use in each country. The research was conducted according to guidelines established by the Council of American Survey Research Associations.⁸

2.3 | Statistical analysis

The survey administration system required completion of each item so there was no missing data for primary variables. The use of skip patterns resulted in appropriately missing data, such as those people who indicated they were unaware of a condition were not asked follow-up questions. The data were weighted according to the population size using the most recent available country-specific census data. For Likert scale questions, the lowest two categories and the highest two categories were collapsed for three mutually exclusive categories. Descriptive statistics were generated using PROC SURVEYFREQ in SAS 9.4 (Cary, NC, USA) to summarize the findings. Comparison of proportions and their corresponding 95% confidence intervals (CI) with $\alpha = 0.05$ were calculated to compare differences across categories. Logistic regression analysis using PROC SURVEYLOGISTIC was used to estimate awareness while controlling for age group, gender, and country. The Rao-Scott χ^2 test was used to estimate differences in proportions across categories.

3 | RESULTS

The targeted age-, sex-, and country-specific sample sizes were obtained and the distribution of demographic characteristics is summarized in Table 1. The distribution of education level was significantly different by country ($p < .01$). The proportions of respondents who had at least some college or university for each country were: Thailand (88.1%), US (78.6%), Argentina (71.5%), Canada (63.4%), Australia (63.2%), UK (62.6%), Japan (57.4%), Netherlands (35.2%), Germany (30.6%), and Uganda (24.3%).

3.1 | Awareness of atrial fibrillation

Overall awareness of atrial fibrillation was 48% (95% CI: 46-50%) and was lower than all other conditions except deep vein thrombosis (43%). Reported awareness was highest for diabetes and hypertension (85% for each). Figure 1 shows overall awareness for each condition and Table 2 reports awareness stratified by age group, gender, relative

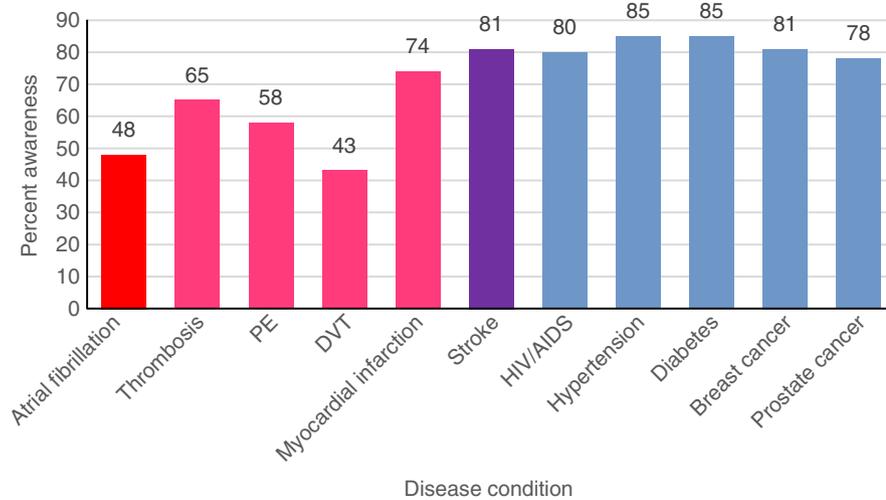


FIGURE 1 Average overall awareness of selected health conditions (n = 6324). Atrial fibrillation in red, other thrombotic conditions in pink, stroke (combined ischemic [thrombotic] and hemorrhagic [non-thrombotic] stroke) in purple, and non-thrombotic conditions in blue. PE, pulmonary embolism; DVT, deep vein thrombosis

population density of residence, and country. There was a significant increase in awareness of atrial fibrillation by age group; however, this pattern did not hold for the other conditions. Females were significantly more aware of atrial fibrillation, pulmonary embolism, deep vein thrombosis, stroke, hypertension, and breast cancer than males. By country, Uganda reported the highest awareness of atrial fibrillation (69%, 95% CI: 64-75%) and Canada reported the lowest (25%, 95% CI: 21-29%).

3.2 | Underlying cause, description, and symptoms of atrial fibrillation

The majority of participants accurately recognized atrial fibrillation as an irregular, usually rapid heartbeat (62%, 95% CI: 60-64%). However, only 36% (95% CI: 34-38%) were aware that atrial fibrillation can lead to stroke. This proportion was only slightly higher than the proportion of respondents who were incorrect in their reporting that atrial fibrillation leads to high blood pressure (30%, 95% CI: 28-31%). The distributions of these and other responses regarding the recognition of signs, symptoms, and sequela are shown in Table 3.

Among the 1764 (24.7%) participants who reported that they would know what atrial fibrillation felt like if they experienced it, recognition of symptoms was relatively high, as shown in Table 4. Heart palpitations were the most commonly identified sign (82%, 95% CI: 80-85%) while fatigue and inability to exercise were the least commonly identified symptoms (43%, 95% CI: 39-46%). The proportion of participants selecting an incorrect risk factor ranged from 8% to 20% and incorrect risk factors identified included coughing up blood, temporary paralysis of a limb, numbness, and a tingling or burning sensation.

3.3 | Risk factors for atrial fibrillation

The distribution of recognition of correct and incorrect risk factors for atrial fibrillation was similar, as shown in Table 3. The recognition of correct risk factors ranged from 8% to 52%, while the reporting of incorrect risk factors ranged from 3% to 42%. High blood pressure

(52%), smoking (46%), and obesity (43%) were the three most recognized risk factors while asthma (8%) and hyperactive thyroid (9%) were the least recognized risk factors. In contrast, lack of exercise (42%) and high cholesterol (37%) were the most common factors mistakenly identified as risk factors for atrial fibrillation.

3.4 | Agreement with atrial fibrillation-related statements

Figure 2 summarizes the levels of agreement participants had with four separate statements about atrial fibrillation. For each statement, the proportion of participants providing neutral responses ranged from 41% to 46%, suggesting a lack of certainty. Regarding the two questions about taking a pulse as a diagnostic method for atrial fibrillation, 41% of participants correctly disagreed that “taking your own pulse is a reliable way to diagnose atrial fibrillation” but only 32% of respondents correctly agreed that “atrial fibrillation can easily be diagnosed by a doctor taking your pulse” vs 24% of respondents who disagreed. Only a minority of participants (37%) correctly disagreed that atrial fibrillation is always treated with surgery. In contrast to an earlier question where only 36% of respondents reported awareness that atrial fibrillation could cause stroke (Figure 2), 46% (95% CI: 45-48%) of respondents agreed with the statement that atrial fibrillation could cause a stroke.

3.5 | Indications for anticoagulants

Recognition that anticoagulants play a part in the treatment of atrial fibrillation was 31% (95% CI: 29-32%). There was relatively high awareness that anticoagulants have a part in preventing or treating thrombosis (53%, 95% CI: 51-54%), stroke (52%, 95% CI: 50-54%), and myocardial infarction (49%, 95% CI: 47-51%), but low recognition of their roles in preventing complications related to pulmonary embolism (31%, 95% CI: 29-33%) and deep vein thrombosis (42%, 95% CI: 40-44%). In addition, 27% of participants (95% CI: 26%-29%) mistakenly thought that anticoagulants are used to prevent high blood pressure.

TABLE 2 Overall awareness and 95% Confidence Intervals (CI) of selected health conditions stratified by age group, gender, population density of residence, and country (n = 6324)

Demographic characteristic	Atrial Fibrillation		Thrombosis		PE		DVT		Myocardial Infarction		Stroke		HIV/AIDS	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Overall	48	46, 50	65	63, 67	58	56, 59	43	41, 45	74	72, 75	81	80, 83	80	79, 82
Age (years)														
40-60	47	43, 48	64	61, 66	58	55, 61	42	39, 45	73	71, 76	82	80, 84	82	80, 84
61-74	50	48, 52	67	65, 69	59	57, 61	44	42, 46	75	73, 76	81	80, 83	78	76, 80
75+	54	52, 56	65	63, 67	53	51, 55	46	44, 48	73	71, 75	79	77, 80	75	74, 77
Gender														
Female	52	50, 55	67	65, 70	61	59, 63	48	45, 50	75	73, 77	83	82, 85	82	80, 83
Male	43	41, 46	62	60, 65	54	51, 57	38	36, 40	72	70, 74	79	77, 81	79	77, 81
Density of residence														
Major city	48	45, 50	65	63, 67	58	56, 61	42	40, 45	73	71, 75	80	78, 82	80	78, 82
Minor city	49	46, 52	64	61, 67	56	53, 59	42	39, 44	75	72, 77	83	81, 85	81	79, 83
Rural	46	41, 52	65	60, 70	58	53, 64	51	46, 57	75	70, 80	81	76, 85	79	75, 84
Country														
Argentina	44	38, 50	74	68, 79	67	62, 73	41	35, 47	87	83, 91	85	81, 90	85	81, 89
Australia	44	39, 49	74	69, 78	62	56, 67	81	77, 86	79	75, 84	88	84, 91	86	82, 90
Canada	25	21, 29	58	52, 63	68	62, 73	22	18, 26	78	74, 83	80	76, 85	80	75, 84
Germany	59	54, 64	73	68, 77	68	63, 73	35	30, 39	75	71, 80	75	71, 80	70	66, 74
Japan	44	40, 49	53	49, 58	27	23, 31	7	5, 10	77	73, 80	78	75, 82	75	72, 79
The Netherlands	41	36, 46	73	68, 77	69	64, 74	16	12, 20	58	53, 63	73	68, 77	70	65, 74
Thailand	51	43, 60	64	56, 72	30	23, 38	26	19, 34	72	65, 80	65	57, 73	80	73, 87
Uganda	69	64, 75	51	45, 57	35	29, 40	44	38, 50	68	62, 73	92	89, 95	94	92, 97
United Kingdom	41	36, 46	78	74, 83	66	61, 71	82	78, 86	73	68, 78	84	80, 88	83	79, 87
United States	67	62, 72	56	50, 60	66	61, 71	62	57, 67	72	67, 77	83	79, 87	82	78, 86

(Continues)

TABLE 2 (Continued)

Demographic characteristic	Hypertension		Diabetes		Breast Cancer		Prostate Cancer		Haemo-distension Syndrome		None of these	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Overall	85	84, 87	85	83, 86	81	80, 82	78	77, 80	7	6, 8	9	8, 10
Age (years)												
40-60	84	82, 86	85	83, 87	82	80, 84	78	76, 81	9	7, 10	10	8, 11
61-74	87	85, 88	85	84, 87	80	79, 82	78	76, 80	6	5, 7	9	7, 10
75+	88	86, 89	83	81, 84	78	76, 79	77	75, 79	5	4, 6	8	7, 9
Gender												
Female	87	86, 89	86	84, 87	84	83, 86	78	77, 80	7	6, 8	9	7, 10
Male	83	81, 85	83	82, 85	78	76, 80	78	76, 80	8	6, 9	10	8, 12
Density of residence												
Major city	85	83, 87	84	82, 86	80	78, 82	78	76, 80	8	6, 9	9	8, 11
Minor city	87	85, 89	86	84, 88	83	81, 85	79	76, 81	7	6, 9	9	7, 10
Rural	84	80, 89	83	79, 87	81	76, 85	79	74, 83	7	4, 10	12	8, 15
Country												
Argentina	90	86, 94	89	85, 92	86	82, 90	85	80, 89	8	4, 10	6	3, 10
Australia	89	85, 92	89	86, 93	87	84, 91	86	82, 90	3	1, 5	8	5, 11
Canada	82	77, 86	85	82, 89	83	79, 87	80	75, 84	3	1, 5	11	7, 14
Germany	84	81, 88	79	75, 83	73	69, 78	71	67, 76	11	8, 14	11	7, 13
Japan	82	79, 85	81	78, 84	80	76, 83	78	75, 82	5	3, 7	15	12, 18
The Netherlands	78	73, 82	78	73, 82	71	67, 76	72	68, 77	3	1, 5	13	10, 17
Thailand	77	70, 84	84	78, 90	78	72, 85	73	66, 80	28	21, 35	11	6, 16
Uganda	92	89, 96	93	90, 96	87	83, 91	69	64, 75	18	13, 23	0	0, 0
United Kingdom	88	84, 92	87	83, 90	84	80, 88	83	79, 87	8	5, 11	10	6, 13
United States	89	86, 93	84	81, 88	81	76, 85	81	77, 85	8	5, 11	7	4, 10

AIDS, Acquired immunodeficiency syndrome; DVT, Deep vein thrombosis; HIV, Human immunodeficiency virus; PE, Pulmonary embolism.

TABLE 3 Distribution of Awareness of (a) How to Describe Atrial Fibrillation, (b) The Sequelae from Atrial Fibrillation, and (c), The Risk Factors for Atrial Fibrillation (n = 6, 324). Response options for each category are stratified by correct and incorrect responses

Description, sequelae, and risk factors	n*	%†	95% CI
Correct description			
Irregular, usually rapid heartbeat	4124	62	60, 64
Incorrect descriptions			
Blood clot in vein	283	6	5, 7
Tumor in heart	96	2	2, 3
Blood clot in brain	70	1	1, 2
None of the above	465	7	6, 8
Not sure	1286	21	20, 23
Correct sequela			
Stroke	2462	36	34, 38
Incorrect sequelae			
High blood pressure	1781	30	28, 31
Blood clot in lungs	968	15	14, 16
Diabetes	352	6	5, 7
Cancer	161	3	2, 4
Correct risk factors			
High blood pressure	3312	52	50, 53
Smoking	2819	46	44, 47
Obesity	2657	43	41, 45
Heart failure (CHF)	2315	37	35, 38
Drinking too much alcohol	1945	31	29, 32
Age 75+	1974	27	26, 29
Diabetes	1257	20	18, 21
Hyperactive thyroid	552	9	8, 10
Asthma	535	8	7, 9
Incorrect risk factors			
Lack of exercise	2699	42	40, 43
High cholesterol	2325	37	36, 39
Not moving for long periods of time	1307	20	18, 21
Varicose (spider) veins	546	9	8, 10
Donating blood	144	3	2, 3
Other	69	1	0.7, 1.4
None of the above	131	2	1.6, 2.5

CI, confidence interval.

*Unweighted counts.

†Percent of weighted frequency.

3.6 | Haemo-distension syndrome

The overall distribution of awareness of the fictitious haemo-distension syndrome was 7% (95% CI: 6-8%) and the distribution by age, gender, location of residence, and country is shown in Table 2.

TABLE 4 Distribution of symptoms of atrial fibrillation, stratified by correct and incorrect responses, among those who indicated they knew what atrial fibrillation would feel like if they experienced it (n = 1764, 24.7% of the participants)

Symptoms	n*	%†	95% CI
Correct symptoms			
Heart palpitations	1491	82	80, 85
Shortness of Breath	972	57	54, 60
Dizziness	769	47	44, 51
Chest pain	724	46	43, 49
Fatigue/inability to exercise	748	43	39, 46
Incorrect symptoms			
Tingling or burning sensation	298	20	17, 23
Loss of sensation/numbness	278	19	16, 22
Temporary paralysis of a limb	242	17	14, 20
Coughing up blood	102	8	6, 11

CI, confidence interval.

*Unweighted counts.

†Percent of weighted frequency.

Among those who indicated they were aware of this syndrome, 29% (95% CI: 23-35%) indicated they were either “very concerned” or “extremely concerned.”

3.7 | Health messaging organizations

The reported public recognition of three large non-profit organizations as sources of health messaging is reported in Table 5. The American Heart Association was recognized by the largest proportion of respondents (14.7%), while the World Heart Federation and the European Society of Cardiology were recognized by 8.4% and 6.4% of respondents, respectively.

4 | DISCUSSION

In our sample including representation from 10 countries across six continents, we found that global public awareness of atrial fibrillation is only 48% (95% CI: 46-50%), and substantially lower than awareness of hypertension (85%), diabetes (85%), stroke (81%), breast cancer (81%), and HIV/AIDS (80%). Not surprisingly, atrial fibrillation awareness was lower among the general public than among patients with atrial fibrillation in most countries, such as 78% in Estonia (among stroke patients),⁹ 63% in the UK,¹⁰ 61.9% in Ireland,¹¹ and 60% in the US.¹² In addition, awareness of atrial fibrillation was significantly associated with increasing age group, a trend not found with awareness of other conditions. We deliberately focused this survey on those 40 years of age or older, and especially 60 years or more, because age is such a strong risk factor for atrial fibrillation.

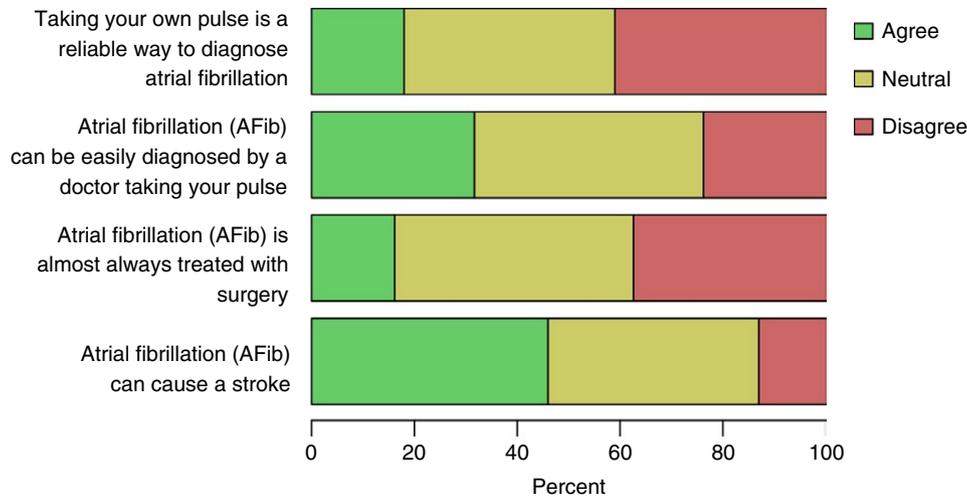


FIGURE 2 Distribution of agreement with statements regarding atrial fibrillation (n = 6324)

The results indicate there is a need to increase public awareness that atrial fibrillation is an important risk factor for stroke. In the section of the survey in which we asked about awareness of sequela from atrial fibrillation, 36% of participants correctly indicated stroke was an important sequela. In a subsequent section of the survey, participants were asked to indicate their level of agreement with four different statements, including the statement “Atrial fibrillation can cause stroke,” for which 46% either agreed or strongly agreed. Given the relatively more leading nature of asking participants to agree with a statement compared to selecting an item from a list, we suspect that the first question provides a more accurate assessment. However, the difference between the two measures is minor and does not affect the overall importance of communicating the health message that early detection and treatment of atrial fibrillation is a key opportunity to prevent stroke.

From a public health perspective, the finding that only 32% of participants agreed with the statement “Atrial fibrillation can be easily diagnosed by a doctor taking your pulse,” indicates that there is an opportunity for healthcare and public health professionals to

communicate a simple, potentially life-saving message that atrial fibrillation can be diagnosed relatively easily and inexpensively, and that strokes associated with atrial fibrillation can be prevented.

Our results show a relatively high degree of internal and external consistency. Evidence of internal consistency includes the low proportion of participants (7%) who incorrectly indicated awareness of the fictitious haemo-distension syndrome. In addition, the results in Table 4 demonstrate that among participants who indicated that they were aware of atrial fibrillation, 82% correctly identified heart palpitations as a symptom and $\leq 20\%$ of these participants selected incorrect symptoms. Evidence of external consistency includes the similarity of the awareness of the other selected conditions with the awareness reported in our previous global survey, which was conducted in 2014 and was focused on venous thromboembolism.⁷

Some weaknesses deserve comment. First, the online nature of the survey restricts respondents to those with internet access. Such individuals tend to be younger in age and have more education and higher income than those without such access. The age differential is illustrated by the fact that no respondents over the age of 61 years were recruited in Thailand and none 75 years or older were recruited in Argentina. In addition, people who voluntarily participate in online surveys/market research may not be representative of the general population. We did not collect information about participants' occupation and therefore cannot assess any potential impact occupational-related knowledge has on participants' awareness of the surveyed diseases. However, the finding that Ugandan health care institutes were mentioned more frequently than most other countries' health care facilities (Table 5) prompts us to hypothesize that a disproportionately large number of health care professionals were among the respondents in Uganda. A further limitation is the potentially leading nature of survey questions. Although these limitations may result in an overestimation of public awareness of atrial fibrillation, they are unlikely to result in an underestimation.

In conclusion, there is poor global awareness about atrial fibrillation. Increasing awareness will empower the public to seek care so

TABLE 5 Distribution of responses regarding organizations from which participants recalled having seen or heard health messaging regarding atrial fibrillation

Health messaging source	n*	% [†]	95% CI
European Society of Cardiology	351	6.4	5.6, 7.3
American Heart Association	838	14.7	13.3, 16.0
World Heart Federation	466	8.4	7.4, 9.4
Other [‡]	432	6.3	5.5, 7.1

CI, confidence interval.

*Unweighted counts.

[†]Percent of weighted frequency.

[‡]Common responses in the “Other” category included: “Uganda Heart/Cancer Institute,” (n = 112) and “Mulago Hospital” in Uganda (n = 52).

that atrial fibrillation can be diagnosed and treated to lower the risk of stroke. By obtaining these baseline measures, we will be poised to measure the impact of campaigns aimed at raising awareness, which ultimately should reduce the burden of disease. Campaigns such as ISTH's World Thrombosis Day have the potential to make lasting and meaningful improvements to people's lives by increasing awareness of atrial fibrillation and other thrombotic conditions.

AUTHOR CONTRIBUTIONS

Primary manuscript preparation: A.M. Wendelboe; secondary manuscript preparation: G.E. Raskob and all authors; data analysis: A.M. Wendelboe and J.D. Dvorak; study conceptualization: all authors; survey development: all authors.

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